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| 09/224,401 | 12/31/98 | HOSUR | S | TI-28734 |

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| NGUYEN, H | |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

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1- File Copy

PTO-90C (Rev. 2/95)
*U.S. GPO: 2000-473-000/44602

# Office Action Summary

| Application No. | Applicant(s) |
|---|---|
| 09/224,401 | Hosur et al. |
| **Examiner** | **Group Art Unit** |
| Hanh Nguyen | 2662 |

☐ Responsive to communication(s) filed on _____

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

**Disposition of Claim**

☒ Claim(s) *1-45* is/are pending in the applicat

Of the above, claim(s) _____ is/are withdrawn from consideration

☒ Claim(s) *29-45* is/are allowed.

☒ Claim(s) *1-28* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

**Application Papers**

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____ .

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

☐ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

*--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---*

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1- 8 and 10-28 are rejected under 35 USC 103(a) as being unpatentable over **Gilhousen et al.** (US Pat. No. 5,056,109) in view of **Sousa et al.** (US Pat. No. 5,832,044).

- Regarding claims 1, 2, 12, 17-19 and 22, **Gilhousen et al.** discloses, in Fig.3, a power control system using CDMA method represented by a base station receiver. A power measurement 60 receives a multiple of mobile unit transmitted signals via an antenna 52, analog receiver 54, and digital data receiver 56 (a measurement circuit receives a first input signal and a second input signal ). See col.12, lines 35-60 & Abstract. Fig.6 illustrates a detail power control system of Fig.3. In Fig.6, a power average circuit 118 averages the largest output symbols from decoder 116 and outputs a signal indicative of each average power level to a comparator 120 (the measurement circuit producing an output signal corresponding to a magnitude of the first and the second signal). See col.16, lines 20-27. The comparator 120 also receives a power level set signal

indicating a desired received power level set by the control processor along with the output signal outputted from the power average circuit 118. (a control circuit receives the output signal and a reference signal). See col.16, lines 27-30. The comparator 120 compares the two input signals and provides an output signal indicative of the deviation of the average power level from the desired power level (the control circuit is arranged to produce a control signal in response to a comparison of the output signal and the reference signal). See col.16, lines 30-35. **Gilhousen et al.** does not disclose specifically that the first input signal and the second input signal are being transmitted at a first time and from different antennas respectively. **Sousa et al.** discloses a fading resistance transmission that uses either of three types of transmitter diversity: antenna diversity, frequency diversity, or time diversity. In particular, these diversity techniques consist of the simultaneous transmission of data modulated signals over a set of L different antennas, L different carrier frequencies, or L different time slots (the first input signal and the second input signal are being transmitted at a first time and from different antennas respectively). See col.3, lines 18-25. Fig.1 shows that the base station has L transmitter antennas, the mobile station has a single antenna, and each of the L links has a different fading amplitude (each input signal has a magnitude). See col.6, lines 25-30. Therefore, it would have been obvious to one having ordinary skill in the art to combine the fading resistance transmission as disclosed by **Sousa et al.** with the power control system using CDMA method as disclosed by **Gilhousen et al.** to arrive at the claimed invention in order not to provide any additional power or bandwidth and to balance the power across multiples antennas.

- Regarding claim 25, **Gilhousen et al.** discloses, in Fig.6, that after the comparator 120 compares the two input signals and provides an output signal indicative of the deviation of the average power level from the desired power level, the output signal is provided to power up/down command generator 122 which generates either a power-up or power-down command to cell-site transmit modulator (receiving at least a control signal transmitted from an external source) for transmission and control of transmitter power of mobile unit N (producing and transmit a transmit power level of each antenna in response to the control signal ). See col.16, lines 30-40.

- Regarding claims 13, 15 and 16, the limitations of these claims have been addressed in claim 1.

- Regarding claims 3, 14 and 20, **Gilhousen et al.** discloses, in Fig.3, that digital data receiver 56 receives the wideband spread spectrum signals for correlating and despreading the mobile unit (first and second input signals is a wideband CDMA). See col.12, lines 50-55.

- Regarding claim 4, the limitation of this claim has been addressed in claim 1.

- Regarding claim 5, the limitation of this claim has been addressed in claim 1.

- Regarding claim 6, the limitation of this claim has been addressed in claim 25.

- Regarding claims 7 and 21, the limitations of these claims have been substantially addressed in claim 1. In addition, **Gilhousen et al.** discloses, in Fig.3, a comparison process between a received power measurement and a preset power level as a proof to show that each of the transmitted input signal has a predetermined value. In particularly, when the received power

measurement is greater than the preset level, the adjustment command is generated such that the mobile unit transmitter power is reduced. When the received power measurement is less than the preset level, the power adjustment command data bits are generated to indicate that an increase in mobile unit transmitter power is necessary (each of the first and second predetermined signal has a predetermined values). See col.13, lines 1-10.

- Regarding claim 8, the limitation of this claim has been addressed in claims 1 and 7.

- Regarding claim 10, **Gilhousen et al.** discloses that the mobile unit transmitted signal experiences Ray-Leigh fading before arriving at the cell-site receiver. Corrections are made at the mobile unit to correct for Ray-Leigh fading in the cell-site transmitted signal (first and second signals are Rayleigh fading parameter estimate). See col.12, lines 1-15.

- Regarding claim 11, **Gilhousen et al.** does not disclose the total path diversity of the first and the second input signals is at least twice a number of transmitting antennas. **Sousa et al.** disclose that the transmission bit rate can be increased with no loss in performance and without using more bandwidth by transmitting two carriers that are in phase-quarature from each antenna This ensures the 2L signals (where L is the number of antennas as discussed in claim 1) do not interfere with one another and the bandwidth efficiency is twice as high (the total path diversity of the first and the second input signals is at least twice a number of transmitting antennas). See col.7, lines 15-27. Therefore, it would have been obvious to one having ordinary skill in the art to combine the fading resistance transmission as disclosed by **Sousa et al.** with the power control

system using CDMA method as disclosed by **Gilhousen et al.** to arrive at the claimed invention in order to resist fading and increase the bandwidth efficiency.

- Regarding claim 23, the limitations of this claim have been addressed in claims 1 and 21.

- Regarding claim 24, the limitation of this claim have been addressed in claim 8.

- Regarding claim 26, the limitation of this claim has been addressed in claim 19.

- Regarding claim 27, **Gilhousen et al.** discloses, in Fig.6, if the received power at the cell-site is higher than that desired of mobile unit N, then a power-down command is generated and transmitted to mobile unit N. If the received power at the cell-site is too low, then a power-up command is generated and transmitted. The power adjustment command feedback compensates for changes in the inbound channels that are independent of the outbound channels. Thus, the power adjustment command feedback is used top compensate for adjustments in mobile unit transmitter power based on the inbound channel path losses (the respective transmit power level has a same transmit power adjustment for antenna in response to one transmit power control signal). See col.16, lines 41-64.

- Regarding claim 28, the limitation of this claim has been addressed in claim 1.

Claim 9 is rejected under 35 USC 103(a) as being unpatentable over **Gilhousen et al.** (US Pat. No. 5,056,109).

- Regarding claim 9, **Gilhousen et al.** does not disclose the measurement circuit , the control circuit and the estimate circuit are formed on a single integrated chip. However, it is well

known in the art to design the measurement circuit, the controller circuit and the estimate circuit on a single integrate chip as described on CDMA-95 standards. Therefore, it would have been obvious to one having ordinary skill in the art to build these circuits on the chip and use the modified chip in **Gilhousen et al.** 's power control system to arrive at the claimed invention.

Claims 29, 32-35, 37, 40-43 and 45 are rejected under 35 USC 103(a) as being unpatentable over **Gilhousen et al.** (US Pat. No. 5,056,109) in view of **Sousa et al.** (US Pat. No. 5,832,044), and further in view of the **Bolgiano et al.** (US Pat. No. 5,859,879).

- Regarding claim 29, **Gilhousen et al.** does not disclose selecting a diversity pattern, symbol pattern having plural elements corresponding to plural signal sources and plural times, and produce an overlay of each element of diversity pattern. **Bolgiano et al.** discloses, in Fig.3, a diversity improvement on the base station to transfer station link. Generally, using multiple transfer stations as transmission diversity resources allows the users at CDMA receiver to evaluate the quality of the signal from each transfer station and request handoff as better links (symbol pattern having plural elements corresponding to plural signal sources and plural times). See col.6, lines 20-30. The mobile user receives the same data packet at three different times from three different antennas and uses the best data packet to reduce the effect of fading (selecting a diversity pattern ). See Abstract. The producing of overlay pattern has been disclosed in "Prior art" labeled Fig.5. This shows that the overlay pattern is a well-known pattern in time space diversity transmission. Therefore, it would have been obvious to one having ordinary skill in the

art to combine the wireless communication system as disclosed by **Bolgiano et al.** with the power control system as disclosed by **Gilhousen et al.** to arrive at the claimed invention in order to select the best signal at the mobile station.

- Regarding claim 37, a limitation of this claim is substantially directed to the same subject matter in claim 29. In addition, **Gilhousen et al.** discloses, in Fig.6, that the output of filter 114 is provided to a user data decoder circuit 116 which provide user data and largest filter symbols to power circuit 118 (decoding the overlay pattern according to a diversity pattern and symbol a pattern). See col.16, lines 17-22. Therefore, it would have been obvious to one having ordinary skill in the art to combine the wireless communication system as disclosed by **Bolgiano et al.** with the power control system as disclosed by **Gilhousen et al.** to arrive at the claimed invention in order to balance power across transmitting antennas.

- Regarding claims 32 and 40, the limitations of these claims have been addressed in claim 1.

- Regarding claims 33 and 42, the limitations of these claims have been addressed in claims 1 and 29.

- Regarding claim 43, the limitation of this claim has been addressed in claim 1.

- Regarding claim 34, the limitations of this claim has been addressed in claims 1 and 29.

- Regarding claims 35 and 45, the limitations of these claims have been addressed in claim 1.

- Regarding claim 41, the limitations of these claims have been addressed in claim 37.

Claims 30, 31, 38 and 39 are rejected under 35 USC 103(a) as being unpatentable over **Gilhousen et al.** (US Pat. No. 5,056,109) in view of **Sousa et al.** (US Pat. No. 5,832,044), in view of **Bolgiano et al.** (US Pat. No. 5,859,879), and further in view of **Bottomley** (US Pat. No. 5506861).

- Regarding claims 30, 31, 38 and 39, **Gilhousen et al.** does not disclose each of diversity pattern is one of true and a complement of another. **Bottomley** discloses that traditionally, receiving a transmitted sequence or its complements indicates whether the information bit is a +1 or -1, sometimes denoted as "0" or "1". The traditional receiver correlates the received signal with the complex conjugate of the bit sequence to produce a correlation value ( each of diversity pattern is one of true and a complement of another). See col.2, lines 15-25 & lines 45-58. Therefore, it would have been obvious to one having ordinary skill in the art to combine the method of CDMA demodulating signals as disclosed by **Bottomley** with the power control system as disclosed by **Gilhousen et al.** to arrive at the claimed invention in order to sum the path symbols.

### *Response to Arguments*

2. Applicant's arguments filed on 1/8/2001 have been fully considered but they are not persuasive.

Regarding claims 1 and 22, Applicant argues that neither **Gilhousen et al.** nor **Sousa et al.** discloses the step of receiving a first input signal from a first antenna of a transmitter and

coupled to receive a second input signal from a second antenna of a transmitter at a first time; producing an output signal corresponding to a magnitude of the first and the second input signals; and the combination of any two types of diversity. Examiner does not agree because **Sousa et al.** discloses a fading resistance transmission that uses either of three types of transmitter diversity from base station to mobile station where the base station has L antennas. See col.6, lines 25-30. The three types of diversity are antenna diversity, frequency diversity, and time diversity. In particular, these diversity techniques consist of the simultaneous transmission of data modulated signals over a set of L different antennas (the first input signal and the second input signal are received at a first time from a first antenna and a second antenna respectively). See col.3, lines 18-25. In addition, Fig.1 includes L- antennas base stationtion and a single antenna mobile station. **Bolgiano et al**. discloses a wireless communication system that combines time and space diversity to reduce fading and and simplify receiver design (combination of any two types of diversity). See Abstract. Fig.9 shows a combiner 908 that receives signals from CDMA receivers A, B and C and then outputs the output of which to memory buffers and time slot multiplexer 910 ( producing an output signal corresponding to a magnitude of the first and the second input signals). See col.10, lines 42-50.

***Allowable Subject Matter***

Claims 29-45 are allowed because the prior art does not disclose the step of producing an overlay of diversity pattern with symbol pattern.

***Conclusion***

*3.* **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Nguyen whose telephone number is (703) 306-5445. The examiner can normally be reached on Monday-Friday from 8:00AM to 5:00 PM.

If attempts to reach the examiner by telephone is unsuccessful, the examiner's supervisor, Hassan Kizou, can be reached on (703) 305-4744. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

5. **Any response to this action should be mailed to :**

Commissioner of Patents and Trademarks

Washington D.C. 20231

**or faxed to :** (703) 308-6743 or (703) 305-3988

**For informal or draft communications**, please label "PROPOSED"or"DRAFT"

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Dr. Arlington VA, Sixth floor (Receptionist)

March 14, 2001

HN

Hanh Nguyen

Ajit Patel
Primary Examiner